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Combat Crew

strategic air command

MAY 1985

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Combat Crew

GEN BENNIE L. DAVIS
COMMANDER IN CHIEF, SAC

BRIG GEN GEORGE LEE BUTLER
INSPECTOR GENERAL

COL CHARLES J. WINGERT
DIRECTOR OF SAFETY

STAFF

EDITOR
MAJ BOB NEIDRICK

ASSOCIATE EDITOR
KEN MAASSEN

ART EDITOR
W.A. KIRKPATRICK

EDITORIAL ASSISTANT
M. J. ABBOUD

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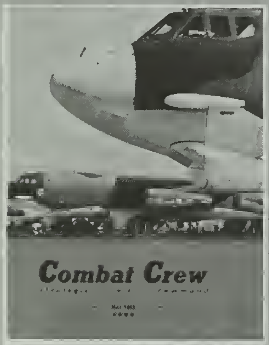

ON OUR COVER

B-52's lined up on the ramp. For more on the B-52, see "The Harpoon at Loring," page 8.

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SAFETY AND
THE ESSENTIA

This month's *Combat Crew* has one of the finest articles I've ever read on the role of supervision in preventing mishaps. Penned by Lieutenant Colonel Dick Szafranski, former Commander of the 69th Bombardment Squadron, it lays out in lucid, detailed terms the obligations and complexities of supervising a flying operation. For me, the most compelling aspect of his commentary is the emphasis on intelligent analysis of what can go wrong, coupled with the need for timely, forceful intervention to keep risks to a minimum.

Analysis and intervention. Therein lies the core responsibility of every supervisor for saving lives, preventing injury and protecting resources from damage or destruction. This is a responsibility with both moral and legal overtones, because the supervisor's actions — or inaction — are subject to both public condemnation and disciplinary proceedings when found to be causal factors in a mishap. Consequently, for both personal and professional reasons, safety must be the constant preoccupation of those charged with directing the actions of other people.

I described that preoccupation in an earlier article for *Combat Crew* as **"a state of mind and a way of life."** Ideally, that type of attitude and behavior with regard to safety stems from individual discipline and common sense. In reality, however, safety awareness and compliance in the typical unit are directly related to the emphasis and effort put forward by its leadership. In fact, that relationship holds true at every level in the chain of command. As 1984 closed, I looked back ten years to compare our **record low 28** ground fatalities with earlier rates. The record shows that in 1974, **82 people died** in ground mishaps in Strategic Air Command! Why such a remarkable improvement? The Air Force Chief of Staff spelled it out clearly in his citation accompanying the plaque recognizing SAC's Special Achievement in Ground Safety for 1984: emphasis at

SUPERVISION — L INGREDIENT

all levels of command on motorcycle safety, seat belts and anti-DWI initiatives. To put it more bluntly, command-wide programs of education, training and hard nosed policies aimed at reinforcing and, where necessary, making up for a shortage of individual discipline and common sense.

Yes, emphasis does work. That is why, for example, we at the Headquarters have instituted the concept of periodic Safety Weeks to help local commanders focus their attention on particularly important periods throughout the year. In that regard, **Safety Week II** for 1985, which takes place this month, was carefully chosen to coincide with the annual **"101 Critical Days"** campaign. Gearing up mentally and physically for the "hazy, lazy" and potentially deadly days of summer should be our foremost concern as plans are laid for the summer sports, leisure and travel season. What are **you** doing as a supervisor to keep your people alive and safe from the perils of local rivers; pushing too hard to cut a day off a trip back home; leaving the squadron picnic under the influence; or letting the fire in the outdoor grill go unattended? Do you buckle up without fail and make clear that you expect everyone to do the same — that to you, wearing a seat belt is a matter of maturity and a sense of responsibility? Better yet, do you communicate that you genuinely care about your people and that you feel a deep sense of obligation for their welfare?

In the final analysis, the crucial role of the supervisor is bound up in the sad truth that the vast majority of mishaps are preventable. As I have reviewed safety incident reports from units throughout the Air Force for the past ten months, they take on a familiar pattern of lessons gone unheeded, of tragedy revisited, of young people who fall victim to circumstances their supervisors surely should have foreseen and precluded. It is crystal clear to me that safety in our Air Force is closely allied to the bond of trust which underwrites teamwork, leadership and mission accomplishment. It is inherent in the conviction of crew members that schedules have been well thought out; of young airmen that they have been properly trained; of missile maintenance technicians that driving conditions have been assessed; of our children that the things they can reach and swallow will not snuff out their lives. My charge to you therefore is simple and direct — make it your constant goal to insure that those who depend on you will **Stay Alive in '85 — by Keeping their Safety First** in your thoughts, your words and your actions.★

Brig Gen George Lee Butler
HQ SAC Inspector General

ATTENTION OPERATIONS

This is addressed to everyone who has, or hopes to have, the responsibility for supervising flight operations. I've been in six different bomb squadrons in five different wings, have kept my eyes and ears open to what some of the best wing commanders in history have done and said, and believe I've learned some good ways to insure effective supervision of safe flight operations. This is not to say it's easy. Flying is a dynamic process with so many variables that the permutations of things that can become unsafe are nearly limitless. People, machines, tasks, weather, and time can combine to create scary scenarios with terrifying outcomes. Those are real problems, but they're no less real than the rock solid requirement that supervisors have to insure flight operations are conducted safely. "Safely" to me is pretty plain: no one hurt, nothing damaged. So, as an operations supervisor, how do you insure the flying is effective and safe?

First, accept that you are the Flying Safety Czar for your squadron. It ain't the guy in wing headquarters or the captain who does such a fine job on his additional duty. It's you. You are responsible and accountable by virtue of your duty title. If the supervisor doesn't clearly demonstrate that safety is demanded, the rest of the folks will give something else higher priority. Once you accept that it's your job and not someone else's, then you start behaving in a way congruent with that belief: *you* wear your seatbelt; *you* become intolerant of pencil-whipping or missing the monthly meeting; *you* do things to meet *your* responsibilities.

Most of our flying is done in the monthly "flow." The first thing you ought to do is scrutinize the flow. A bad flow (one that is abusive of the crew or machine, one that disregards 100 years of known and predictable climatology, one that ignores circadian rhythm, one that has crews flying day sorties and night sorties in the same week, etc.) is an assassin that's lying in wait to kill someone. Ask the hard questions: Can a 1400 takeoff and a 0200 landing meet the same objectives that your 2330 takeoff and 0900 landing is designed to meet? Is it necessary to do an hour of transition after flying eight hours and hitting the IAF at 0100? If you're doing double night low levels, do you want to do the mountainous one first or last? Answers like, **"We've always done it that way,"** or **"Maintenance doesn't want us landing during that time,"** or **"Sorry, next quarter is already planned"** may not be the right answers. A flow that's abusive to crews can kill them.

"People, machines, tasks, weather, and time can combine to create scary scenarios with terrifying outcomes."

A good flow for October through December may not be a good flow for April through June. Nonetheless, schedules tend to get rigid and it may be a big battle to make them potentially more safe. Even if you have a good, safe, effective flow, you're obviously not done.

Know the risks involved in your operation. When you match crews and tail numbers to missions in the flow, you're beginning to enter that dynamic process where a bunch of small risks can combine to become one too-big one. Evaluate everything you can get your hands on: the machine and its history; the pilot team and nav or nav team; the tasks required and their sequencing; the weather; time of day; season of year; and the "other" stresses. All of the following are small risks taken individually: an airplane with a history of single generator malfunctions; a 1700 hour pilot with 200 UE hours; a brand new navigator; a mountainous low level with two racetracks; a lightweight air refueling after low level; low ceiling for takeoff; night; winter; a copilot whose wife is expecting a firstborn momentarily. Individually each of those risks is small and manageable. Now, operations supervisor, combine them.

Maybe we should send an IP along, eh? Maybe not. I can't say because I don't know the risks involved in your operation. I know what I'd do if it were my operation. The point is that you are responsible and accountable for assessing and managing the risks in your operation. Say you decided not to send an IP (instructors by definition are operations supervisors, as are crew commanders) and the airplane breaks in preflight with a four hour ETIC. It's no longer a mission in the flow. It's a new and different mission. What now? Still a **"low risk"** mission?

There's some hard data that tells us that UE hours are more important than total flying time, that there's a relationship between delayed or changed missions and mishaps and that risks increase when people are under stress. It's your job to insure that airplanes are not lost. Think about that carefully before you assess the level of risk as **"low."**

Your ability to assess and manage risks is enhanced if you execute what you create. Fly the flow you've sanctioned. When I was an ops officer I created a night sortie that was so damn innovative a crew could complete 60% of their quarterly requirements on one mission. On paper it looked just dandy. I scheduled myself as IP on the inaugural flight. The real pilot went DNIF at base ops and I had to fly it in the seat. It was the first and only time our wing flew it. It was terrible. Too risky. All operations supervisors (including schedulers) should taste the full plate of delicacies they've created or accepted. Those aren't faceless crew numbers who do the flying for ICTS credit, they are real live people who do it to pursue or maintain proficiency in skills critical to warfighting.

These real live people are better

SUPERVISORS

Lt Col Richard Szafranski
AFROTC, Univ of Indiana

able to help you manage risks if they're required to do more than just a little supervised stress training every quarter. The operations supervisors who create the Wing Directed Training Plan ought to create it with an eye toward risk management. Look at your monthly maintenance summary to find out what systems are failing or breaking. Devise training requirements that allow the crews to manage the risk when that system fails. For example, current and forecast mean time between failure (MTBF) rates for the J-57 engine ought to lead operations supervisors to the conclusion that simulated engine-out practice should increase. If the MTBF for No. 1 engine-driven hydraulic pumps is down real low, we ought to be practicing airwork that simulates the loss of that system. Prepare them for the worst. It's much less worrisome to sit in the command post or on the flight line recovering an engine-out IFE when you know the pilot has done two simulated engine-out landings under IP supervision earlier in the quarter.

The operations supervisor at the cutting edge is the crew commander. The crew commander has a lot of power, but rarely does he or she have the power to make policy for the whole operation. That's your job. If you assess the risk as anything but **"low,"** it ought to be your policy that the operation have appropriate flight and ground supervision. Higher risk operations are those where the sum total of small risks in an operation adds up to a bigger risk, where the mission has such high visibility that extra attention is required to insure it goes as planned, where the crew is required to approach an operational limit of the machine, where weather is at the lower limit, where the task is novel (Maple Flag) or unfamiliar (first flight after alert following two weeks of leave), or where individual or crew proficiency is known or suspected to be below the level required for the task. If this strikes you as conservative, all I can say is that it appears to work.

To summarize, the rules I suggest are: accept that you are responsible and accountable for safe operations; make sure your routine flying schedule is a safe one; pay special attention to routine missions which, because of a delay or change, are suddenly not **"routine;"** consciously assess the level of risk in the whole operation and each of the component parts; experience the same risks you're exposing others to; define and practice increased risk maneuvers; and supervise increased risk operations. There are only two more suggestions that I have, but they're critical to making the whole thing work.

First, listen to what the crews are telling you about the operation. Get a feedback vehicle that allows an on-going assessment of risk and annoyance levels. They do it more than you and and they know what they're talking about. If a bunch of folks agree that a particular sortie profile is not a good one, or a safe one, fly on it with your weakest crew. You'll probably agree and have to change it or supervise it every time it's flown. Verbal feedback isn't the only kind of feedback you need to be alert to. Look for a relationship between DNIF's — temporary medical groundings — and what's going on in the operation. If crews mission plan on alert to fly before starting CCRR, or fly three 10-hour missions in one week, or turn from day to night or night to day in a single week, human materiel failures may occur. If 10% of the folks in a certain cycle go DNIF, there's maybe at least another 10% that are pressing on despite some physical impediment. The 10% that are hurt but flying anyway increase the level of risk for your operation. Only the best supervisors are aware of **"normal"** and seasonal DNIF rates and correlate these with crew activity flows. I can't prove it, but I think that physical health is an indicator of mental health. Like **"morale,"** it's hard to measure and use, but all deviations from the norm need to be evaluated.

Last, and perhaps most important, when in doubt, be there (on the ground or in the aircraft) yourself. You're 100% accountable, so it's too risky to only be 90% responsible. **That's what you get all that extra operations supervisor pay for anyway.**

Lt Col Szafranski was the 69 BMS Commander until October 1984 when he assumed his current position as the Professor of Aerospace Studies, University of Indiana, AFROTC Det 215.

FUN WITH STAN/EVAL

OR WHAT TO DO CHEC

Capt Terry Godby
4017 CCTS, Castle AFB

You psyched yourself up. You studied. You prepared. You had a plan for every contingency: if the air had lost its lift, you would still have known exactly what to do. Some days are worse than others, however, and you've just busted your checkride — or think you have. What should you do now?

First of all, no matter what you did, don't say anything to anybody until after the critique. Now is the time to be discreet. Every potential bust has to be validated within the stan/eval division hierarchy and reviewed by the DO. What happened may not have been as bad as you thought and may qualify as a momentary deviation. Since the critique won't be until tomorrow, a good night's sleep may give the evaluator a different perspective. In short, don't give up hope. And, perhaps more importantly, don't waste the time between the end of the flight and the critique. Prepare your best defense.

During the critique be attentive, polite and professional. When the event that busted you is being discussed avoid sarcasm, shouting, crying, blaming your navigator, violence, bribery, blackmail or storming out of the critique. Explain your side of the story — calmly. If you have solid documentation why the evaluator should not bust you, present it now. Don't rationalize. If you simply forgot to do something, like lowering the gear, admit it without placing too much blame on extenuating circumstances. Now is the time to listen; the evaluator may have some suggestions that will prevent you from making the same mistake again. Don't prolong this unpleasantness with your weak, sorry excuses. You busted. Take it like an adult — a professional.

Now that the critique is over, there are some other pitfalls you must avoid. Don't firebomb the evaluator's house or kill his dog even though you may feel perfectly justified doing these things. Hey, if you're having a bad week and try any of that stuff, you'll probably screw it up too. Don't refuse to sign the Form 8. Your signature merely acknowledges that the checkride took place, not that you agree with the results. Refusal to sign will accomplish nothing. The ride will count anyway. The political repercussions will be worse than those you will suffer because of the checkride. Remember, you're trying to keep this 500 pound bomb crater from looking like a 1000 pound bomb crater.

One of the reasons you may feel bad is someone has just told you that you're unqualified in the thing you do best. It all seems a little unfair. Let's put this in perspective. First of all, a checkride is not a test to determine if you can fly. We know you can fly. A checkride is not a flight evaluation board (FEB). Even though you failed this checkride, you're going to get another checkride. Nobody is saying you can't fly or else the next step would be an FEB. A checkride is more than anything else, a character building exercise — we want to see how you deal with adversity. The school solution, of course, is to avoid the slime and pass the checkride the first time. The game is not lost, however, if you bust your checkride. The best way to explain the process is fair is to present it in graph form.

During the critique be attentive, polite, and professional.

If, on the mission planning day of the checkride, you were to plot out the possibilities, you would probably come up with something like this:

Pass — +10
Mission Cancel — 0 **(Graphs not drawn to scale)**
Fail — −50

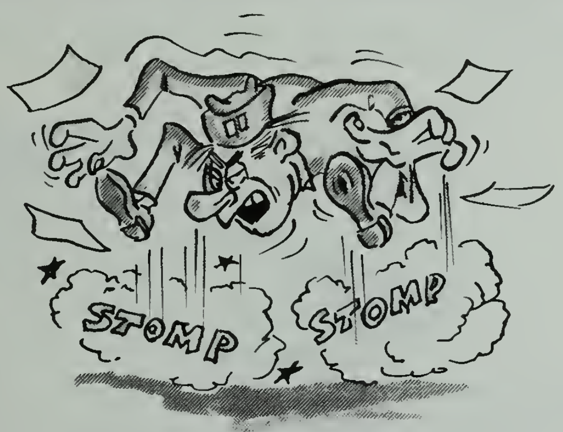
If the checkride is cancelled for some reason, you don't get any points. If you pass the checkride, you'll get ten points for doing a good job and go on alert next Thursday, as scheduled. If you fail your checkride, you'll lose 50 points and your upgrade slot next month.

If, on the critique day of the checkride, you were to plot out what had happened, your emotional graph would now look like this:

Pass — **+10**
— **0**
Fail — **−250**

IF YOU BUST YOUR KRIDE

When the event that busted you is being discussed avoid sarcasm, shouting, crying, blaming your navigator, physical violence, bribery, blackmail, threats, or storming out of the critique.



You know you would have received ten points if you had passed your checkride, but since you busted and never planned for this possibility (nobody does!), you feel a lot worse than you ever would have believed.

The next step is to prepare for and pass the re-check. For openers, if you failed the emergency procedures test, nothing less than 100% will be satisfactory on the retake. A realistic graph of the second checkride might look like this:

Pass — **+1**
— **0**
Fail — **−10,000**

If you bust this time, concern will deepen and a brochure extolling the upward mobility opportunities as an insurance salesman will be stapled to your Form 8. If you pass, you get one point and are only down 249 points — which is a heck of a lot better than 10,000.

Patience and tenacity are now the keys to your continued success. It's going to take a while for this failure to wear off. Don't take comfort in the cliche, "There are those people who have busted a checkride and those who will." The truth is, some people make it through their entire flying career without busting a checkride. Passive solutions are too slow. For example, waiting for a new commander who won't remember this bust could take months, as could the Wedge Theory (Since you just failed, you're at the bottom of the squadron pyramid; somebody, however, will do worse than you soon and wedge his way underneath you. As this process is repeated, you gradually work your way back to the top).

You must prove that your performance on the day of the checkride was a momentary deviation and not typical of your day to day performance. First, correct whatever it was that caused you to bust. You don't want this to happen again. Now is an excellent opportunity to try to correct everything else that is wrong; to get your 249 points back you're going to have to shine a little bit more than you used to. The major mistake most people make during this phase of the recovery, besides being too patient, is they aren't patient enough. The critique was probably not the end of the bad things that are going to happen to you. Other folks, like your squadron commander, may have unpleasant things to say. Recover from this spin with dignity and grace. Don't badmouth the evaluator at every opportunity. Don't twist the story around making yourself the hero. It happened. It's over, let it die. Stan/eval has the avenue to share the story of your screwup with the rest of the squadron so everyone will profit from your mistake without dragging your name into it.

As I said before, the system is fair and good can come of most every honest mistake. Let's assume for illustration that the squadron commander busted a checkride in 1968. He's probably amassed a couple of thousand points since that day and is 1750 points ahead now. He knows what it's like to fail. This has given him the ability to see both sides of the story. He hasn't learned to tolerate failure, but he has learned that failure is possible and that it is painful enough to make success a more alluring goal. He has also learned what causes failure; he knows how to better avoid it and to tell others how to avoid it. Thus, the system gets better.

So, if you think you busted your checkride, hope for the best until you know for sure. Prepare a defense. Be professional at the critique. Take responsibility for what you did; the evaluator didn't bust you, you busted yourself. Pass the re-check. Expect a recovery phase. Be patient. Use that time to improve yourself. Above all, *don't make this a habit — unless you think you'd like selling insurance.*

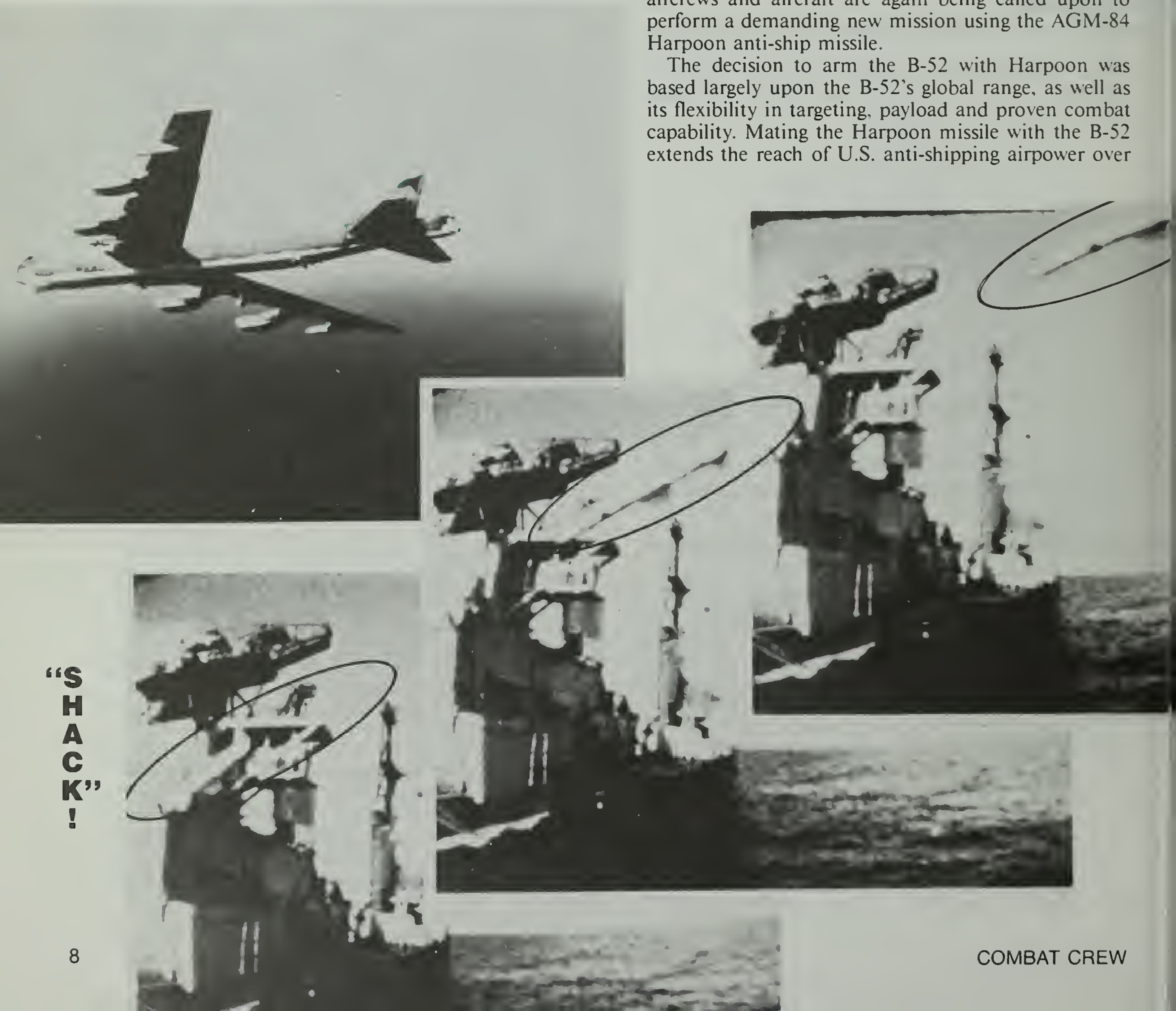
THE HARPOON AT LORING

Capt B. J. Galloway
1Lt Mark B. Hemphill
69 BMS, Loring AFB

If someone started talking to you about "Harpoon" would your first thought be of Moby Dick or some other seafaring tale? For B-52 aircrews of the 69th Bombardment Squadron (69 BMS), Loring AFB, Maine, "Harpoon" means the AGM-84, a highly sophisticated, air-launched missile designed to attack enemy ships.

In the late 1940's the B-52 was conceived as a high altitude strategic bomber. The increased threat posed by newer, more sophisticated defenses forced the venerable B-52 into the role of low-level penetrator during the 1960's. Vietnam saw the B-52 put to effective use as a conventional bombing platform. During the 1970's, new ECM gear, low-light TV and infrared sensors, and the Short Range Attack Missile (SRAM) significantly improved the effectiveness of the B-52 weapon system. Recently, the Air Launched Cruise Missile (ALCM) has added even more capability to the B-52. Now, B-52 aircrews and aircraft are again being called upon to perform a demanding new mission using the AGM-84 Harpoon anti-ship missile.

The decision to arm the B-52 with Harpoon was based largely upon the B-52's global range, as well as its flexibility in targeting, payload and proven combat capability. Mating the Harpoon missile with the B-52 extends the reach of U.S. anti-shipping airpower over



every ocean on the globe and will materially aid the U.S. Navy in maintaining our vital sea lines of communication.

The AGM-84 Harpoon is a non-nuclear, anti-ship missile that uses a self-contained radar seeker and inertial guidance system to home in on and destroy hostile ships. The missile is about 150 inches long, 13 inches in diameter and weighs roughly 1200 pounds. Of that weight, the 500-pound hardened-steel warhead contains a potent dose of high explosive. Harpoon can be launched from either high or low altitude and the missile's long standoff range permits the B-52 to execute an attack while remaining outside of enemy defenses. Once launched, Harpoon is designed to fly a high speed, low altitude "sea-skimming" profile to complete the attack. A single B-52, fully loaded with Harpoons, has the equivalent firepower of an Aegis class guided missile cruiser.

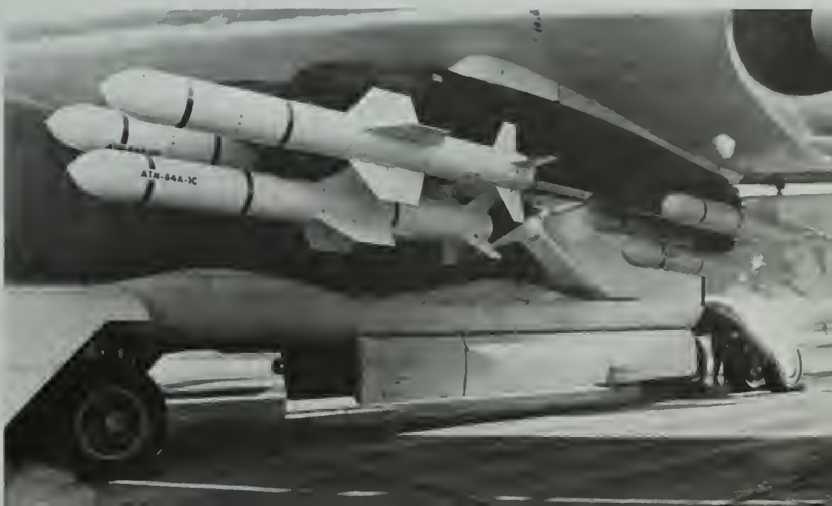
The procurement and integration of a new weapon for the B-52 does not tell the whole story, however. Professional crewmembers are the key to success with any new weapon system. The 69th Bombardment Squadron crews at Loring AFB are currently involved in an intensive program to integrate the Harpoon missile with the B-52 system and develop new tactics for its employment. To successfully accomplish integration and development of the system, the pilot and navigation teams aboard the B-52 are required to have a working knowledge of the missile's systems, missile programming and emergency procedures. To date, many man-hours have been invested in tactics development.

The new mission and its tactics have revealed a need to maintain the close working relationships with U.S. and NATO naval and maritime reconnaissance units to insure the system's tactical effectiveness. Crews of the 69 BMS have participated in a series of open ocean exercises, each exercise being conducted in conjunction with naval surface and aerial units. These realistic scenarios have proven the ability of 69 BMS aircrews and aircraft to successfully perform this new assignment.

The 69 BMS achieved a limited operational capability in October 1983 and expanded to fully operational status in December 84. Another B-52 squadron is scheduled to gain this important new combat capability by mid-1985.

Harpoon delivery is an exciting new mission. The versatile B-52 is ready to take on the demands of this new role. And, as always, the professionalism of SAC's combat crews has made it all possible. The next time you hear the word "Harpoon" don't think of cruelty to animals. Remember that Harpoon is a significant addition to the B-52's arsenal that the combat crews of the 69th Bombardment Squadron are using to help maintain world peace.

Pictured below is the AGM-84 Harpoon missile mounted on B-52Gs based at Loring AFB, Maine.



ALONG FOR THE RIDE

Capt Duane W. Deal, SR-71 pilot
Capt Tom Veltri, SR-71 RSO
1st SRS, Beale AFB

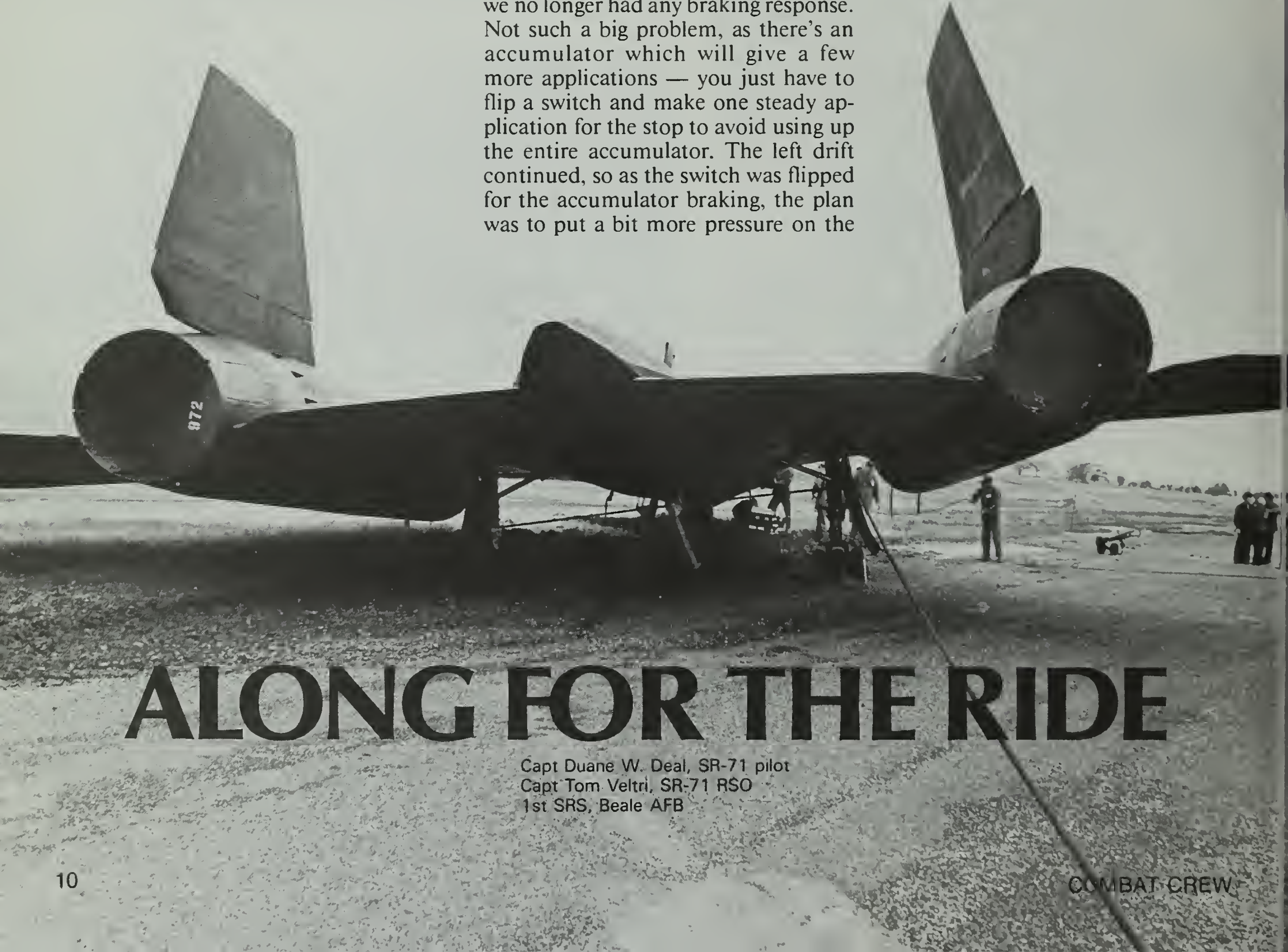
The mission had proceeded just like any other stateside training sortie: we took off, hit the tanker 20 minutes later for a full offload, accelerated and climbed to our Mach 3 altitude, and proceeded on the first leg of the 4700-mile route.

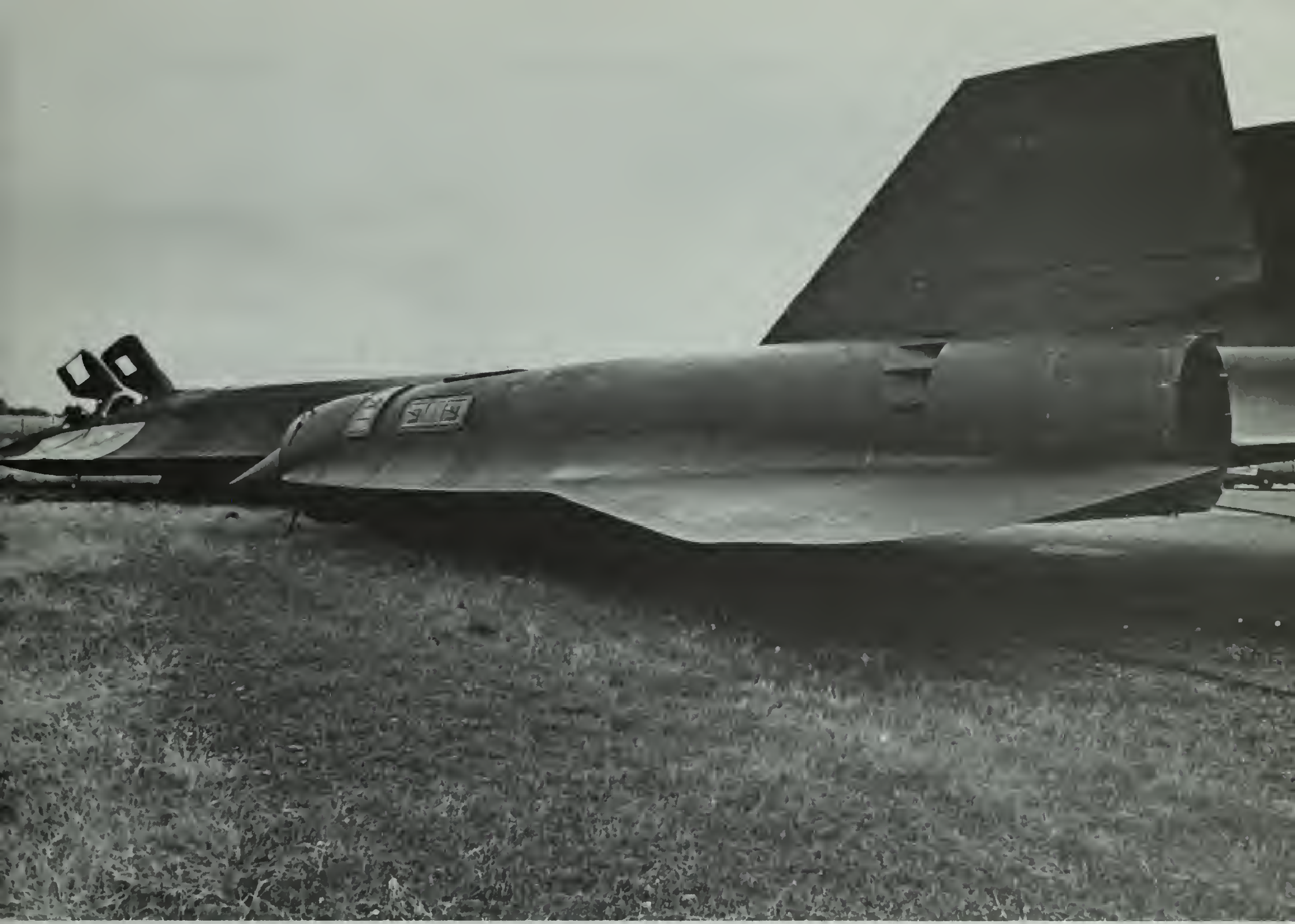
Approaching the descent for our second refueling track, at 76,000 feet about 40 miles off the Pacific coast from San Francisco, the left accessory drive system (ADS) cut loose, giving us catastrophic failures of half our hydraulic, electrical and inlet systems — a major emergency for the SR-71. The boldface procedure was accomplished, and the emergency checklist completed in the descent to the nearest base which was coincidentally our home at Beale. Aside from our voices changing about three octaves, the problem was treated almost like second nature in a testament to the excellent simulator training we'd received on just such an emergency.

As we neared Beale, the gear was extended, an uneventful ILS flown to a normal touchdown, and drag chute extension was accomplished. As we'd lost the primary braking system in the ADS failure, the brakes were checked to ascertain that the alternate system had picked up the load. The brakes appeared to work; however, for some reason the nosewheel steering hadn't been picked up by the alternate system. That was no apparent problem, as differential braking could be used for steering to clear the runway. Per procedures, and beginning to develop a bit of drift from weathervaning, the drag chute was jettisoned. **THEN** the problems began.

With the chute gone, it was time to go ahead and brake to a stop so the emergency response crews could install the pins and we could clear the runway. There was just one problem, though: we no longer had any braking response. Not such a big problem, as there's an accumulator which will give a few more applications — you just have to flip a switch and make one steady application for the stop to avoid using up the entire accumulator. The left drift continued, so as the switch was flipped for the accumulator braking, the plan was to put a bit more pressure on the right brakes to head back to the centerline.

But it didn't matter what was planned — there was no response from the backup system, and with about 6000 feet remaining, we were "along for the ride." We occupied ourselves trying in vain to regain one of the three braking systems (or at least the nosewheel steering) as the landing roll's left drift increased. Looking for help, we transmitted, "We've lost braking." The mobile officer came back with advice to shut down an engine, which was quickly accomplished. Our "barrier, barrier" call was acknowledged by the tower with assurance that the barrier was armed. We were praying that we'd at least make it to the barrier before running off the runway, as the grass





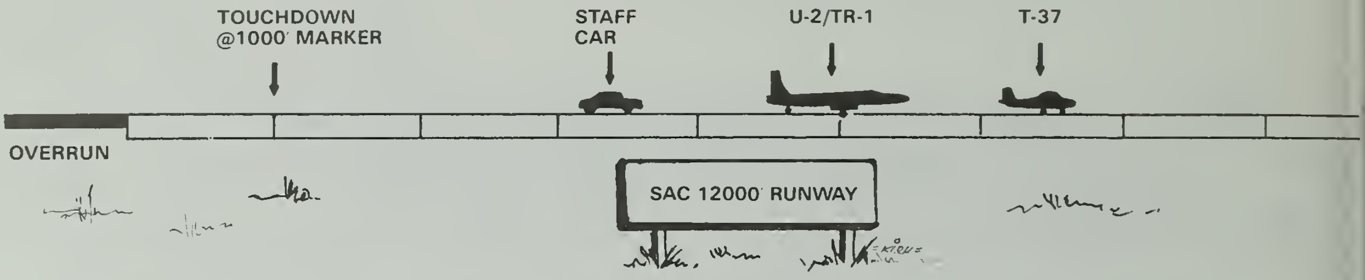
looked closer with each foot we traveled. Even with full rudder applied, we entered the overrun slightly off center. The other engine was then shut down. Rolling for an eternity during which we were certain the barrier, unused since 1968, had malfunctioned, we were relieved when we felt the aircraft tug . . . but it wasn't a straight ahead tug. We veered to the left and shortly thereafter departed the overrun, coming to a quick stop as the heavy SR-71 settled into the mud.

Aside from the standard barrier-caused aircraft damage and some new nicknames for the two of us (i.e., the "mud men," "sticks in the mud," and the like), an incident of potentially disasterous consequences turned out to have a relatively pleasant outcome. This article is aimed at presenting some of the things that may apply to you that we've considered since that day, should you ever find yourself **"along for the ride."**

The following is a series of thoughts on how such a situation may apply to your particular aircraft. Think to yourself how the following items might apply to you, and what you might do if you found yourself rolling down a runway with no steering or brakes:

- Know your backup systems . . . Nearly every USAF aircraft was designed and built with redundancy as a theme, so there should be some type of "stopping system" short of dragging your foot on the runway. Know those systems, how to engage them at a moment's notice, and what to expect from the backup versus the normal system. Since these systems are somewhat difficult to realistically imitate in most simulators, an intermittent review by you and your crew could pay off dividends if you found your jet barrelling down the runway with the primary systems out!
- Many of our aircraft have drag chute systems — Know the nuances of that system: When do you deploy it? What if the normal deployment system malfunctions? Should you retain it throughout the landing? Does your aircraft have a tendency to weathervane with the chute; if so, should you jettison it to maintain a straight track down the runway? Remember, unless it is causing you control difficulties, the drag chute should be deployed and forgotten — you can think about the jettison after the aircraft is safely stopped.
- So you've lost braking, perhaps steering also . . . does your particular aircraft and fuel situation allow you to turn the "full stop" into a "touch and go" and take off again? If so, you'll have to be especially cognizant of whether or not you have enough runway remaining to make a safe takeoff.

FIGURE 1 A "What If-fer":
The drawing below depicts the rolling distance to a stop based on typical landing weights and touchdown speeds for SAC aircraft. Applying the same coefficient of friction to each aircraft, it presents how far a thrustless mass the weight of our aircraft would roll *without* the aid of brakes, thrust reversers, drag chutes, and other such aids. After all, "what if" those items malfunctioned or were nullified by tailwinds, hydroplaning, runway downslope, and the like?

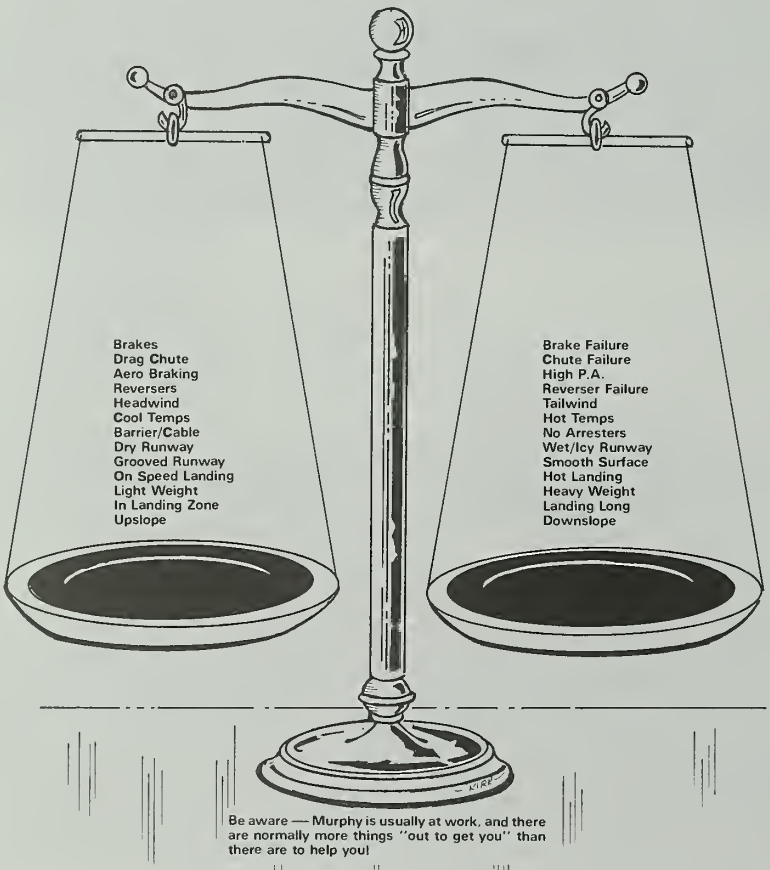


The basis of the above is the combination of typical weights and speeds of SAC aircraft plugged into the formula:

$$S = \frac{\frac{1}{2} m v^2}{F}$$

FIGURE 2

Which way will it tilt today?



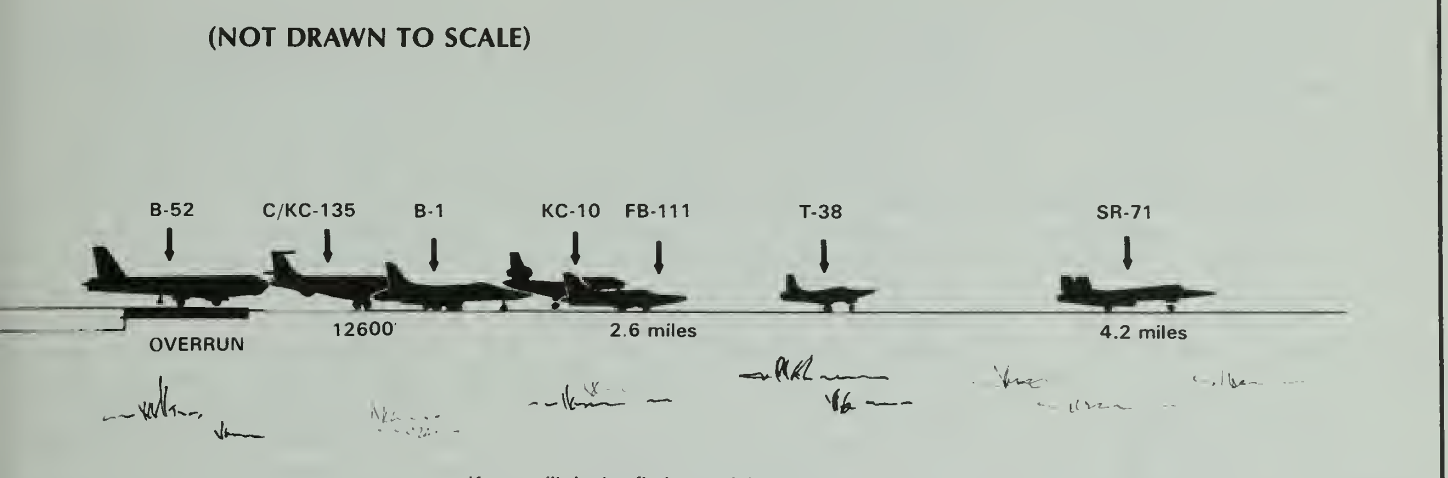
Be aware — Murphy is usually at work, and there are normally more things "out to get you" than there are to help you!

Once airborne again, fuel permitting, contact with the appropriate agencies can be made and options fully discussed prior to attempting another landing. The options could run from taking the barrier/cable to experimenting with a system fix to proceeding to Rogers Lake bed at Edwards AFB where you can roll "forever" on landing.

● IF you've stayed on the runway and IF your Dash One allows it, you might consider the use of differential power to maintain a straight track down the runway in the event of steering loss. Remember to take into consideration the power response of your engines and avoid getting into a PIO which may be worse than the original problem.

● Another decision to consider is shutting one or more engines down to reduce the thrust propelling you forward. Know which one(s) you'll shut down by weighing thoughts such as: Which should I shut down to stop my drift? What systems will be lost by shutting which engines down? If departing a prepared surface, you may wish to shut them ALL down to prevent FOD and the possibility of fire when stopping.

● Well, you've tried everything you can think of, but you're still high-tailing it down that concrete, perhaps headed off the runway or into the lights . . . does your Dash One recommend the option of raising the landing gear



If you still doubt, find a straight stretch of highway and idle your car at 60 mph — see if you don't roll for a third of a mile or so before stopping! Of course, due to aircraft design and aerodynamics, you probably won't roll as far as the drawing illustrates . . . but "what if"?

to come to a safer stop? If so, you'd better know in a heartbeat how to raise the gear on the ground. Most gear mechanisms have an "idiot-proof" safety on them to prevent us aviators from raising the gear when we shouldn't (like on the ground) — so know how to defeat this safety mechanism by practicing it in the simulator and discussing it with your crew.

- Whether you're leaving the runway, taking a barrier or cable, or even if you think you'll stop normally, prepare for the worst by bracing yourself for what might happen. In an ejection seat, lock your harness. In a crew seat and perhaps with passengers on board, alert everyone to assume crash positions due to the possibility of a sudden stop. You may certainly roll to a calm stop, but it'd be prudent to prepare in case you don't.

- If you are going to take the barrier or cable, do your best to try to engage it as your Dash One specifies. Most systems expect a perpendicular engagement, and many function best only if you engage it at runway center. Try to find out the pecularities of the arresting units available to you, and what to anticipate should you be forced to use one of them. Talking with someone who has engaged one before or getting the base civil engineer's office to give you descriptions of the units may quell any concerns you may have about such an engagement.

Editor's Note: In a recent B-52 Class A mishap involving an aborted takeoff, the aircraft inadvertently engaged a barrier on the departure end of the runway. The Safety Investigation Board indicated this "engagement" aided in slowing the aircraft and was a factor in diminishing the damage to the aircraft.

- In a worst case scenario, consider your options if faced with a violent runway departure or impending collision during your rollout. Does your ejection system give you the capability to eject rather than stay with the doomed aircraft? Have you alerted your crew and passengers to be prepared for an evacuation? Is the crew ready? Again, make certain you are comfortable with your knowledge of the options. This may take practice with your life support, personnel and equipment practice in the simulator, and discussion and simulations in the aircraft with your crew; whatever it takes, it'll be well worth the effort if you have to exercise your knowledge.

- On a different note, perhaps you're not the crew in the plane having the problem — you might be the mobile crew, SOF, in an RSU, in the command post, in a chase aircraft, or otherwise in a position to potentially advise the crew having the problem. Are you up on the real problem and the options available to the crew? Hopefully so, for you may be able to interject a recommendation that the crew may not have considered and thus save the day.

- Finally, make certain your normal landing procedures are well practiced and they don't leave the margin to hurt you more if other elements deteriorate. Make on speed, normal weight landings in a suitable touchdown zone. Consider what other factors may do to your landing:

  - Landing distance is increased by 20% for every 10 knots you are above normal touchdown speed — be on speed!
  - Landing distance is increased by 10% for every 10% increase in aircraft weight — be as light as possible!
  - Landing distance is increased by 3.5% for every 1000 feet pressure altitude increase above sea level — be especially aware at high P.A. locations.

The points presented in this article are primarily concerned with things to think about should you find yourself "along for the ride" without brakes and/or steering. However, the bottom line is a common thread that runs throughout articles such as this — take the time to KNOW your systems. No matter what aircraft you fly, your system knowledge may be called upon not only to save a USAF aircraft, but you (and those with you) as well. Know how to use your systems; practice using your systems; then, if that time comes when you need them, you'll be able to use them **quickly** and **safely.**

INTEGRATED CEL

Capt
Capt
CFIC,

Have you ever flown an integrated celestial grid navigation leg and had the DNS 50 nautical miles (NM) in error at End Nav? Hopefully the DNS was in error and your skills at navigating had your airplane closer to the planned course. This situation happens frequently to CFIC candidates. During post mission analysis, many opinions are offered to explain this DNS error. Explanations go from "maybe we loaded the wrong convergence factor" to simply "I don't know." One conclusion may be made with certainty: Grid operation of the INS/DNS is among the least talked about procedures in the field. We hope this article will clear up some misconceptions that may exist in your unit about INS/DNS grid procedures.

The INS uses its own true heading reference for navigation during grid operation. It only uses the inserted convergence factor to convert true heading to grid heading for display. The DNS uses the inserted convergence in the same way as the INS. It displays the grid heading when the GRID and DISP keys are pressed simultaneously. This is one of the most misunderstood concepts about DNS grid operation. The convergence factor can be loaded during preflight and should be checked before grid operation, since this value is retained from one flight to the next. When the J-4 is in the MAG mode, the DNS true heading is computed by applying variation to the magnetic heading. (The DNS has variation stored for all locations on earth between latitudes 70°N and 60°S.) The true heading enables the DNS to dead reckon in true geographic coordinates. During grid operation the DNS continues to DR in true, which requires a true heading input.

The act of switching the J-4 from MAG to DG will cause the WARN light to illuminate on the CDU displaying DNS information. The WARN light is telling the user two very important things. First, the machine indicates that slaved (MAG) operation has been exited and that the DNS is now receiving heading information from its memory (heading hold mode). This memory is the last magnetic heading the aircraft was on before entering the DG mode. During this time, DNS true heading is uncoupled from the J-4 compass to prevent it from being disturbed while the compass is being set to grid heading.

Second, the DNS is ready to measure the angle between the magnetic heading in memory and the new grid heading. This measured angle is the key to DNS grid operation. The DNS compares this angle and the geographic coordinates at which it entered DG, and computes its own convergence factor. As long as the J-4 is in DG, the DNS will apply its own convergence factor to the geographic location to produce a convergence angle. This convergence angle is then used to convert the J-4 grid heading into true heading. Once the true heading is obtained, the DNS dead reckons in the same manner it does in magnetic operation.

The next important step in the checklist is to extinguish the WARN light. This clears malfunction code 18. (The fourth digit of the right-hand display indicates a 1 to show that polar navigation is in operation.) The navigator should take command of the DNS at his station to keep the copilot from clearing the code 18 before the proper grid heading has been set on the J-4. The act of extinguishing the WARN light is the signal for the DNS to measure the "angle." For this reason, a fixed airplane heading must be maintained until entry to polar navigation mode is complete.

Once the compass is correctly set and the WARN light extinguished,

grid operation begins. Since the heading calibration function that occurs in MAG operation is nonexistent in grid, DNS present position must be corrected for precession of the J-4 compass. Also, as a matter of technique, keeping the J-4 latitude set as closely as possible to actual latitude will help the DNS dead reckon with increased accuracy.

For grid exit, again the key to success is to follow the checklist explicitly. When the mode selector is switched from DG to MAG, the WARN light will illuminate to indicate that the DNS is in a heading hold mode. During this time the DNS true heading is uncoupled from the J-4 compass to prevent it from being disturbed while the compass is being slaved to magnetic north. The J-4 quickly reslaves itself and is able to provide magnetic input to the DNS. Only after the compass has stabilized (all flags disappear from view), can the WARN light be extinguished to clear the malfunction code 19 from the data display. The fourth digit of the right-hand data display is blank, indicating normal magnetic operation has resumed.

Some think that because the DNS uses the J-4 compass as its heading reference, it is more difficult to navigate in grid. It really is not so difficult, but does require some understanding of how the equipment works. There are at least two other aspects of DNS grid operation which deserve a brief mention here:

1. Working on a Transverse Mercator chart
2. Transitioning between charts with different convergence factors.

OLAR GRID NAV

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e AFB

Transverse Mercator Operation

The Transverse Mercator charts that we use for polar navigation have a convergence factor of 1.0. To determine an accurate grid heading, a correction must be taken and applied from the Transverse Mercator Convergence graph. Because the DNS navigates in true coordinates, the DNS position will be accurate. However, the graph correction must be applied to the grid heading displayed on the DNS to get the accurate grid heading.

Chart Transition

What if now we want to transition from a Transverse Mercator chart to a subpolar chart? After determining the desired grid heading for the new chart, the N-1 compass can simply be reset to the new grid heading. The INS needs a new convergence factor. What about the DNS? Because it uses the J-4 as its heading reference, chart transition is a little more involved. Following the checklist, we find that grid must be exited and re-entered utilizing the new grid reference. Why? Because the DNS must remeasure the new angle between true and grid so it can continue to navigate properly. The DNS computer just cannot go directly from one grid reference to another without starting from "zero" in MAG. Also bear in mind the DNS has variations stored for latitudes 70°N to 60°S. Outside these latitudes, the navigator must manually insert the local variation.

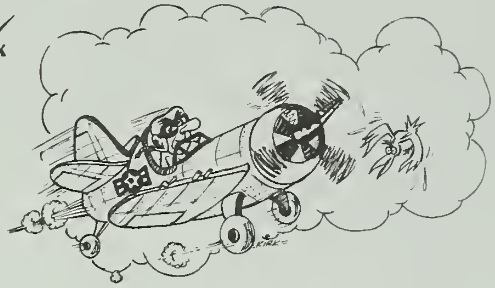
Now is probably a good time to mention a liability of grid operation and the INS. INS air alignment is not possible if initiated with the N-1 in grid. This is because the INS uses an N-1 input during air alignment, but is cut out from the INS in grid. Quite a few navigators have discovered this limitation while doing airborne alignments at CFIC.

Well, hopefully, grid navigation with the INS/DNS will seem less threatening for the average crew. Test for yourself the things we have mentioned in this article and hangar fly what you learn with other folks in your unit. Your collective knowledge can whittle this bear down to size — it is much easier than flip-flopping the ASN-7.

OLD FLYING TALES

SIFC Staff

CROSS CHECK IFC



Do you remember being cleared for an ILS approach and subsequently told to report the final approach fix (FAF)? You probably had some crusty old training flight instructor at some time or other tell you, "What FAF? There's no FAF on an ILS approach!" Did he really mean to say that?

FLIP defines the final approach fix as "the designated fix from or over which the final approach (IFR) to an airport is executed . . ." Who was it that said the FAF is depicted only for use on non-precision (localizer only) approaches? No mention is made in the definition of FAFs that they are only for use in conjunction with non-precision approaches. Make note of the verbiage "over which," we will come back to it. If you look up the definition of final approach point in FLIP you will find ". . . applicable only in nonprecision approaches where a final approach fix (FAF) has not been established . . . the point identifies the beginning of the final approach segment . . ." THEY must have confused the terminologies of final approach fix (FAF) and final approach point (FAP).

Now that we know the proper definition of the FAF let's look into the formation of the FAF in the design of the ILS approach. AFM 55-9 (TERPs, the approach designer's bible) tells us that "the final approach segment shall begin at the point where the glide slope is intercepted, and descent to the decision height (DH) begins." It goes on to say ". . . this point shall be coincidental with a designated FAF." What? TERPs is saying that the ILS glide path is supposed to begin at a designated point called a FAF. I have never seen an ILS approach designed with the glide slope intercept point coincident with a FAF. Continuing on in TERPs we find ". . . at locations where it is not possible . . . the point of glide slope interception shall be located PRIOR to the FAF." This is what I'm used to flying. But it does say an ILS approach will have a FAF, and if a designated FAF cannot be provided, a waiver for the approach must be granted.

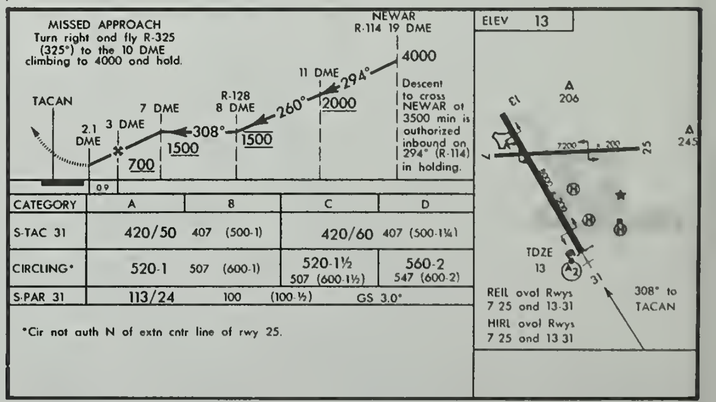
Remember those words from the definition of a FAF I said we would come back to? They are "over which." This must be the part of the definition that refers to ILS approaches. The approach surely will fly over the FAF, even though the final segment of an ILS approach usually begins at a point prior to the FAF. So why does an ILS have a FAF when it isn't usually coincident with the glide slope intercept point? The answer to this question is twofold. First, by providing a FAF on an ILS we have a means of flying only the localizer portion of the ILS if the glide slope is out of service. The optimum position for this FAF on a localizer approach is five miles from the threshold. The maximum distance for the FAF is 10 miles (which happens to be the maximum usable distance for the glide slope). The second reason for the FAF is to provide a geographical point of reference along the ILS final. This is of particular importance when operating in a nonradar environment. The tower controller will use your position in relation to the FAF in order to sequence traffic. This is important for the aircraft in the VFR pattern that is trying to get one more approach while you are on final flying your ILS.

Now when you are told to report the FAF on an ILS maybe the mutterings about this request will come to an end. Yes, there is a FAF on an ILS approach. It normally isn't used the same as on a nonprecision approach, but it is there!

Ever hear the old adage, "If you descend at 1000 fpm after the FAF on a nonprecision approach you will always be in a position to land?" I'm sure you have. This is one of the more popular techniques used at CCTS for training students to fly nonprecision approaches. This technique is popular because it works most of the time. But it doesn't work ALL of the time. We need to teach and use a technique which will work all of the time.

One of the parameters in approach design is for the descent gradient from the FAF to the runway threshold elevation not to exceed 400 feet per nautical mile. If the average final approach airspeed is 150 knots (2.5 miles per minute) this will provide 100 fpm. This is where the magic 1000 fpm comes from. It's great if we land using a four degree visual glide path. If we want to be in a position to land we must get down sooner to pick up the normal three degree visual glide path most of us fly. The 1000 fpm has worked for many because the optimum descent gradient for a nonprecision approach is 300 feet per NM. As you will see there are some approaches that aren't designed with the optimum gradient.

Take a look at the following profile view of a TACAN approach.


MISSED APPROACH
Turn right and fly R-325 (325°) to the 10 DME climbing to 4000 and hold.
NEWAR
R-114 19 DME
4000
11 DME
294°
2000
260°
R-128
8 DME
1500
308°
7 DME
1500
3 DME
700
2.1 DME
TACAN
0.9
Descent to cross NEWAR at 3500 min is authorized inbound on 294° (R-114) in holding.
ELEV 13
206
245
13
7
25
7200
31
TDZE 13
REIL oval Rwys 7 25 and 13-31
HIRL oval Rwys 7 25 and 13 31
308° to TACAN

CATEGORY	A	8	C	D
S-TAC 31	420/50 407 (500-1)		420/60 407 (500-1¼)	
CIRCLING*	520-1 507 (600-1)		520-1½ 507 (600-1½)	560-2 547 (600-2)
S-PAR 31	113/24 100 (100-½) GS 3.0°			

*Cir not auth N of extn cntr line of rwy 25.

The descent gradient from the FAF to the runway threshold elevation is 362 ft/NM. This is within TERPs criteria (less than 400 ft/NM). Descending at 1000 fpm will get you down to the runway for a safe landing. 1000 fpm also will get you down to the MDA prior to the MAP. What about the VDP? Using a 300 ft/NM visual descent gradient, the VDP is located at 2.5 DME. The required descent gradient from the FAF to the VDP is 560 ft/NM. This corresponds to 1400 fpm at 150 knots. Descending at 1000 fpm from the FAF will not provide the normal visual descent (VDP intercept) of 250-300 ft/NM (2.5 - 3 degrees).

Depending upon the location of the MAP we may find ourselves not even getting down to the MDA before the MAP if we use 1000 fpm. How are we going to guarantee that we get down to an altitude to safely make a normal descent to landing? We preach the use of some basic 60:1 relationships. A couple of the most basic involve finding the visual descent point (VDP), if not published, and the descent gradient (DG) to the VDP.

1.

$$\mathrm{VDP} = \frac{\mathrm{HAT}}{\mathrm{VDG}}$$

HAT = height above touchdown

VDG = visual descent gradient (normally 300 ft/NM or the VASI descent gradient)

2.

$$\mathrm{DG} = \frac{\mathrm{ALT}}{\mathrm{DIS}}$$

ALT = altitude to lose from the FAF to the MDA

DIS = distance from the FAF to the VDP

By using these formulas and other 60:1 facts you can be assured of a technique that will always provide you with the necessary information to descend to the MDA in time to make a safe landing. If you want more practice or explanation of 60:1 talk with your unit SIFC graduates.

How often have you asked why SAC requires you to request recommended altitudes on ASR approaches? Who was it that said if you stay a couple of hundred feet below the recommended altitudes you will always get down to your MDA prior to the VDP? I've even heard comments about staying well below the recommended altitudes given by the controller. What are these altitudes that the controller is giving us?

First we must figure out where the controller gets these altitudes. When a controller computes the altitudes required for an ASR final he uses the following formula (it's a little different if there is a stepdown fix).

$$\text{Descent Gradient} = \frac{\text{FAF ALT} - \text{TDZE}}{\text{Dist (NM), FAF to TH}}$$

TDZE = touchdown elevation

TH = threshold

What does this give you? A descent gradient from the FAF to the end of the runway at its elevation. If the controller is using a PAR scope to give the ASR, the distances will be to touchdown, providing a gradient to touchdown. With an ASR scope the distances are to the threshold of the runway. What will happen if you follow the altitudes given? You will follow a gradient to touchdown. Normally the ASR approach will provide 300 feet per nautical mile (3 degrees) descent gradient to the threshold. The closer you follow the given altitudes the closer you will be to the preplanned (3 degrees) descent gradient. You will intercept the MDA at the VDP if you continue this (3 degrees) descent gradient. But what if you prefer to fly a 250 feet per NM visual descent gradient (2.5 degrees VASI)? If you follow the controller's recommended altitudes (for a 3 degree gradient) you may find yourself slightly high (50 feet) at your desired VDP. To prevent being high you will have to keep yourself slightly below (about 50 feet) the controller's altitudes.

Now that we know what descent instructions the controller is giving, what should we do with this information? It is pretty much up to the pilot as to how close to the given gradient to fly. If the weather consists of a low cloud deck (ceiling) the pilot might want to descent below the clouds and fly in at the MDA to the VDP. If you are in a low visibility situation you might want to follow the given gradient (3 degrees) so that your slant range visibility is increased at the moment you reach the VDP. This is the biggest advantage to flying the recommended altitudes. With the nose of the aircraft in a 3 degree downward angle (normal visual descent gradient) your forward vision is better since you won't have as much of the aircraft's nose to look over to see the runway environment. A pilot should be capable of flying either type of approach, depending upon the weather.

The only drawback with flying the recommended altitudes is that you reach the MDA and VDP simultaneously. If the weather prevents you from seeing the runway environment you must begin your level off prior to the MDA to keep from descending below it. This would require you to maneuver the aircraft while researching for the runway environment. If you are already at the MDA prior to the VDP without sighting the runway environment you can still continue to the MAP, without maneuvering while looking for the runway environment. But your slant range visibility will be decreased.

There are pros and cons to both techniques. You as the pilot must weigh them and decide which best meets your given conditions. Remember, for your Stan/Eval check you are required to fly the approach to the MAP while maintaining the MDA if you are not planning on landing out of the approach.

Hopefully you now understand what the controller is providing you when you request recommended altitudes. **Use your judgment! Apply the technique that you feel will best meet your needs.**

An Open Invitation for all Missile Crew Members — R.S.V.P.

Capt Thomas C. Denny
OIC, Vehicle Equipment Control Branch
321 FMS, Grand Forks AFB

I can think of no better way for you, a Minuteman missile combat crewmember, to fully understand the duties and activities of maintenance technicians than to spend a day with them in the field. You will get to see maintenance being performed first-hand and will see many ways of helping the technician do his/her job better. Also, as you gain an understanding of the maintenance process, you'll discover ways to do your job in the launch control center even more effectively.

You'll find that the typical maintenance dispatch is quite a challenge for our young, talented airmen. It starts with two hours of pre-task preparation during which the team will get briefed on the day's job, obtain parts, tools, tech data and equipment, check out and upload their vehicle, get their codes, meet their guards and do the other things necessary to ensure a successful dispatch.

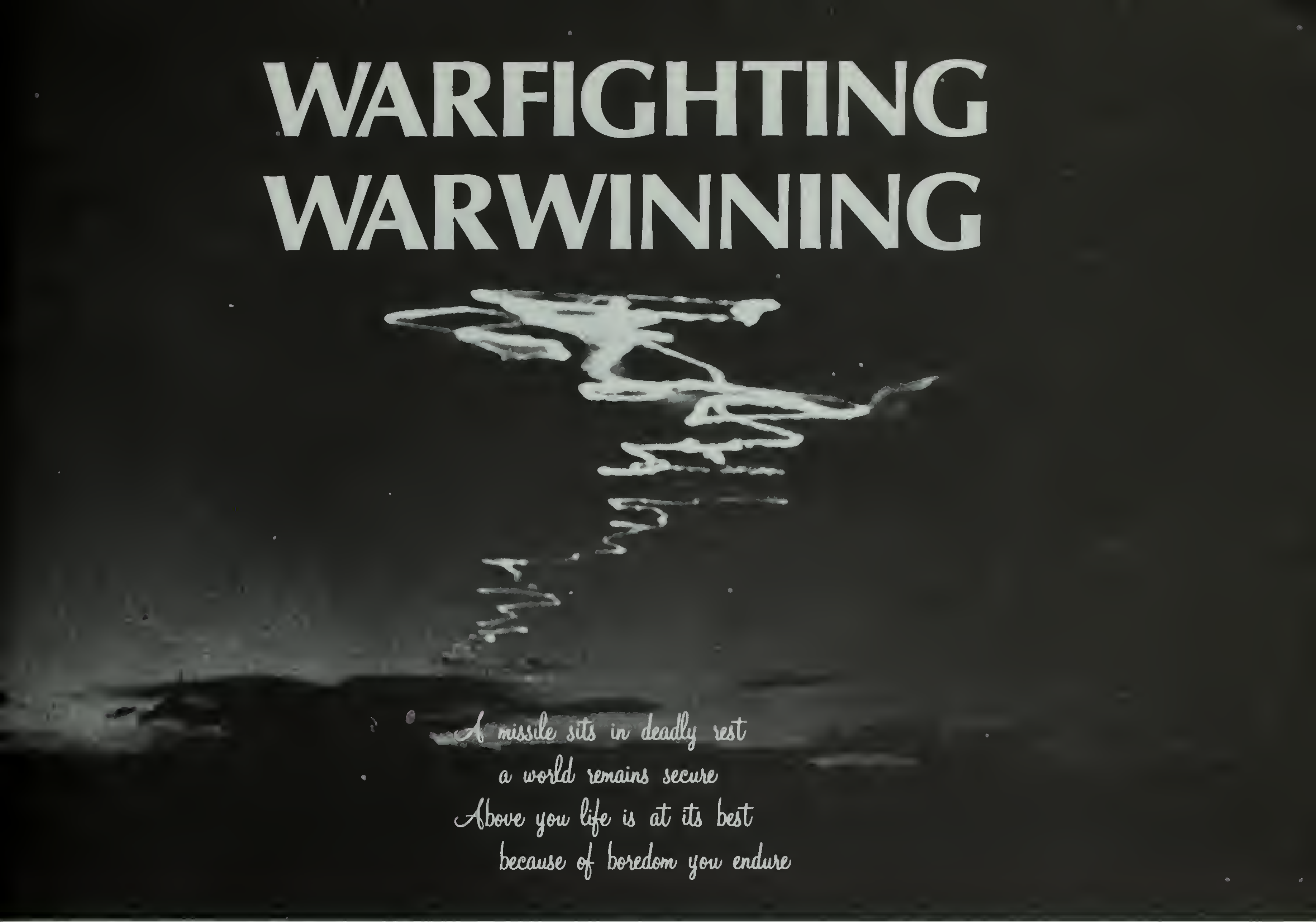
After a one to three hour trip, the team spends another one to two hours of hard work to penetrate the site and set up to do their tasks. Four to eight hours later, and after more hard work to exit the site (hoping for a good security systems reset), they drive back to base where they must download the vehicle, debrief, write up any new discrepancies and order parts as required. All in all, it makes for a long day, one repeated several times a week.

Central to the effectiveness of missile maintenance are delays, which occur for a variety of reasons. Some are due to operational requirements (such as emergency actions message traffic), and simply come with the job. Other delays occur due to the age of the weapon system, the condition and shortage of vehicles and equipment, the long travel distances involved and adverse weather conditions. On the other hand, some delays relating to communication and support by crewmembers are often preventable. Minimizing these delays is critical for missile maintenance technicians. After taking hours to arrive at a site, a 15-45 minute delay for entry because of crew changeover, or a delay for security reset while departing the site can frustrate the best of troops. Worse, work orders may have to be rescheduled, dispatches to second sites canceled, etc. Avoidable delays are costly not only in resources spent on repeat dispatches, but also for the morale of the troops.

Managers at all levels in missile maintenance must and do strive to minimize preventable delays. We do this through careful planning of maintenance tasks to avoid conflicts, to make the correct parts and tools available, and by ensuring that vehicles and equipment are ready to go on time. We also closely monitor the preparation of our maintenance personnel to ensure adequate knowledge of their tasks.

The point of all this is that safe, timely task completion is a cooperative endeavor. Ops and maintenance must work as a team, with a truly professional attitude toward our mission. Therefore, a day spent with a missile maintenance team would be extremely beneficial to you as a crewmember. Witnessing first-hand the challenges in maintenance will deepen your understanding of how the "other half" of the SAC missile team lives. More importantly, it will help all of us to do our jobs more safely, efficiently and professionally. **We look forward to seeing you at the launch facility.**

WARFIGHTING WARWINNING



A missile sits in deadly rest
a world remains secure
Above you life is at its best
because of boredom you endure

These words somehow seem remote from war and its vivid images and sound. There are no symbols of sacrifice, shock, and splendor in the safe, sturdy and sterile world of a launch control center. But for a quarter of a century, men and women of SAC have fought and won a battle greater than any other.

They have not soared through endless skies and danced on silvered wings. They have not seen their targets or scored their hits or felt the thrill of victory. They hear no bugle's frenzied call or mournful note of taps. They wear no medals and reap few praises from those they serve each day.

In their concrete and steel cocoons, they wait for an event that should it ever come to pass will mean they have failed. They are carefully trained and tested to ensure they can do the one thing their very existence is meant to prevent. They know as long as they are ready to launch, they most likely never will. Every hour of every day, the crew force waits. Every hour of every day, the crew force wins a war they hope they will never fight.

Each hour of deterrence is their victory. Every moment of freedom is their conquest. Every day that passes is their prize. What they fight is a war of wills. What they win is time. Time for a child to grow, to learn, to love and to flourish. Time for a nation to break new barriers, heal old wounds, reach new heights and serve its people. Time for a world to solve its problems, feed its hungry, cure its sick, and find peace. Time for mankind to seek out new challenges and be all that it can be.

Time, then, is the prize and the price for today's missile warrior. They have fought and won the war, but having won, they must fight on. Yesterday's deterrence is gone, today's is being won right now, and tomorrow's must be earned. So for the blue-suited missileers, the victory is never final, the battle never finished and the war never over. As you read this, they sit and wait. Their warfighting is constant and the peace we share today is a monument to their skill.

ANONYMOUS

THE CUTTING EDGE

CPOs . . . Proficiency . . . and the Crew Member

Capt Ronald G. Maderas Jr
3901 SMES, Vandenberg AFB

The broadcast begins, "SKYKING, SKYKING — Message follows . . ." The missile combat crew immediately begins copying the emergency action message (EAM), taking great care to ensure each element is recorded correctly. After both crewmembers have the message copied in its entirety, validation procedures are accomplished to ensure the message is authorized by the National Command Authorities. The message is valid . . . the crew quickly transitions to the execution checklist to configure its missiles for launch. Verbalizing each step, the crew commander progresses through the checklist, while the deputy crew commander provides the correct response as each action is accomplished. Suddenly, a complete loss of missile status monitoring occurs. Realizing the priority of commit procedures over the weapon system malfunction, the crew commander immediately directs the crew to continue on with the execution checklist. Nonetheless, the effect of the malfunction is obvious as his voice momentarily cracks under the mounting pressure. Then, from the rear of the Missile Procedures Trainer (MPT), the deputy crew commander yells out, "Don't worry, sir . . . we've got plenty of time left in our CPO!"

My tour of duty at Ellsworth AFB was at its midpoint when Emergency War Order (EWO) Comprehensive Performance Objectives (CPOs) appeared on the scene. In fact, I was a newly certified crew commander, so their arrival had special significance for me in that I had to determine their impact on the proficiency of my crew. In that experience as a combat crew commander, as well as my following assignment as a unit EWO instructor, and now as an EWO evaluator with the 3901st Strategic Missile Evaluation Squadron, I have had the opportunity to observe firsthand the effect EWO CPOs have had on crew proficiency. In many areas, the effect has been good; however, in some cases we may have received more than we were looking for. Take the crew in the MPT; did we really want CPO times to be a part of its consideration during launch activities? As a crewmember when CPOs first came in, I always thought the important thing was crew proficiency — **not** the CPO times. Well, to make a long story short, I got interested in where we are and where we've going with CPOs — so I started checking around. Here is what I found.

CPOs were initially established to provide objective standards to train and measure crewmember performance. Prior to CPOs, crew training and evaluation performances were, for the most part, measured against subjective standards — standards which in many cases differed from evaluator to evaluator or instructor to instructor. What may have been considered an acceptable performance to one evaluator or instructor may not have met the minimum standards of another. An obvious need for a system that established guidelines or set rules by which performance could be **objectively** measured was required. The end product was a list of performances. Realistic constraints were attached to each performance and expected standards of proficiency were established — in short, a straight forward system that was intended to standardize training and evaluation.

The deputy crew commander yells out, "Don't worry, sir . . . we've got plenty of time left in our CPO!"

In my opinion, CPOs did that! I have no doubt that with the advent of CPOs, we made great strides in the standardization area, but (yes, there always seems to be a catch) we may have created a new problem in the process. The problem may very well have originated and grown from not knowing just exactly what CPOs **were** and what they **were not** — and there is one thing CPOs were not. They were not an all-inclusive list of all the skills and knowledge necessary to accomplish the total spectrum of EWO actions. To put this in perspective, imagine if you will a CPO regulation containing **every** performance required for **every** SAC/JCS EAM. Then add to this regulation the volume of information found in SAC regulations and supporting documents that does not appear on any EWO checklist. I'm sure you'll agree that this document would not only be unwieldy and difficult to use, but most likely counterproductive since the vast ma-

Cont'd on page 26

"Weapons Tips"

Editor's Note: Beginning next month this column will be included in a new feature which will provide a crossflow of hazards/incidents which have occurred throughout SAC and the entire Air Force.

No more SAC Two-Man Policy? Yes, but don't rush out and destroy all your no-lone zone signs. With the publication of SAC Supplement 1 to AFR 122-4, we have implemented the USAF Two-Man Concept. This is a change in name only. There are no changes to the basic way we grant authorized access to nuclear weapons and critical components. Initial distribution of the new supplement was made on 6 March 1985; so if you haven't received your copy, check with your PDO. Just remember, the SAC Two-Man Policy and SACR 122-2, Volumes I, II, IV, and V are now obsolete.

Weapon System Safety Rules for all configurations of the Minuteman weapon system have been combined into one regulation and published as AFR 122-23. If you were previously on distribution for AFR 122-25 or 122-30, you will need to establish a requirement for the new regulation.

What? Dropped objects again? As you might remember, we discussed dropped objects in last month's issue. The point of the discussion was not that the hardhat worked (although we are very glad it did). The point is we can't afford to damage our missiles with dropped objects. Recently a dropped work bucket damaged the space shuttle, resulting in mission delays and many dollars spent on repair.

In another incident, a falling hoist pendant cable posed a serious threat of potential injury and damage to a missile guidance set.

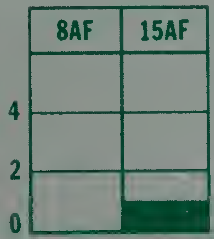
Here's one you might know. AFOSH STD 161-1 prohibits the wear of contact lenses in contaminated atmospheres while using a respirator.

SAC'S FLYING SAFETY RECORD

CLASS A FLIGHT MISHAPS

YEAR	75	76	77	78	79	80	81	82	83	84	85
TOTAL MISHAPS	4	4	4	1	5	4	4	2	2	3	1
FLYING HOURS 100,000	4.2	3.9	3.7	3.6	3.6	3.4	3.5	3.5	3.0	3.4	0.8
FATALITIES	7	22	10	5	7	2	14	9	7	2	3
RATE	1.0	1.0	1.1	.28	1.4	1.2	1.2	.58	.65	.89	.32*

*ESTIMATED RATE BASED ON 310,000 FLYING HOURS



1985 CLASS A MISHAPS	
RC-135T	FEB

CLASS B	
MAR	0
1985	0

CLASS C	
MAR	21
1985	61

FLYING HOURS	
MAR	31,080
1985	84,796

PROFESSIO

Aircraft Maintenance

SSgt Troy E. Holbrook, 28 BMW, Ellsworth AFB, is the SAC Maintenance Airman of the Month. Currently assigned as a team chief, Sgt Holbrook reflects the highest degree of professionalism in the accomplishment of his duties. His standard of excellence has contributed to his aircraft having one of the lowest delayed discrepancy rates in the wing. During exercise Jade Tiger 83, Sgt Holbrook volunteered to deploy as a crew chief. His successful launches and recoveries contributed significantly to the success of the exercise. For his outstanding work he was awarded the Air Force Achievement Medal. Sgt Holbrook was selected as the crew chief to represent Ellsworth AFB in the 1984 SAC Weapons Loading Competition. He went on to win the competition and earn the distinctive title of "Best Crew Chief in SAC." Sgt Holbrook's superior technical competency is unsurpassed. He has never failed a QA or MSET evaluation. During an April 1984 visit by MSET, Sgt Holbrook earned an outstanding score on a preflight inspection task and another outstanding rating with no defects on a supervisory followup of a preflight. In recognition of these tasks, the wing commander presented Sgt Holbrook with an MSET Outstanding Performance Award.

Missile Maintenance

TSgt Willis M. Gastin, 44 SMW, Ellsworth AFB, is the SAC ICBM Maintenance Airman of the Month. Sgt Gastin is a highly proficient quality assurance evaluator who thrives on pressure. He has earned two consecutive highly qualified grades on evaluator proficiency evaluations from the 3901 SMES.

Sgt Gastin recently assisted a depot team in developing and writing technical order procedures for a seldom performed major maintenance task. His section submitted 29 AFTO Forms 22 in 1984. The result — an increased alert rate. Sgt Gastin was hand picked to validate equipment procedures for new simulated electronic launch Minuteman test gear.

Sgt Gastin's leadership is superior. His section continually exceeds SAC standards — more personnel evaluations, more no-notice evaluations, more portal-to-portal evaluations, more configured vehicle inspections and more training-in-progress inspections.

NAL PERFORMERS

Missile Crew

Crew R-055, consisting of 1Lt Michael A. d'Albertis, MCCC, and 1Lt Ladd E. Kettren, DMCCC, 90 SMW, F. E. Warren AFB, is SAC's Missile Crew of the Month.

Lts d'Albertis and Kettren were on alert recently at Foxtrot LCC when a loss of primary power occurred. After the crew processed the emergency power and air procedure, the diesel engine unit took the load and primary power returned.

The facility manager (FM) and site cook were brought down to the launch control equipment building (LCEB) to check power and air indications. They soon discovered that two of the four diesel start batteries had exploded. After ordering the tunnel junction blast door open to prevent hydrogen gas and acid fumes from collecting in the LCEB, the crew directed the FM and cook to spread baking soda on the acid and affected equipment. The clean room damper was also closed to keep acid fumes from spreading.

After finishing the contingency checklist, Lts d'Albertis and Kettren made a communications patch with wing command post, job control, safety, and bioenvironmental engineering. Wing job control directed isolation of the diesel batteries.

The LCC experienced another loss of primary power and switched to commercial power. Emergency power and air procedure was run again as the wing agencies were updated. The LCC experienced another loss of primary power and switched to internal batteries. The FM reported that the diesel engine was attempting to restart; there was also electrical arcing and smoke coming from the destroyed batteries. After running the LCEB fire checklist and isolating the diesel engines, the arcing and smoke ceased. The LCC remained on battery power.

After bringing the FM and cook into the LCC, the crew contacted India LCC and used the capsule as the point of contact for the wing agencies and Foxtrot Flight Security Controller (FSC). Since the capsule was communication violated, additional security was placed around the equipment entrance to the LCC elevator shaft. Commercial power returned to the LCC an hour later. The crew allowed the FM and cook to return topside after enough time had passed to allow the air in the LCEB to clear. The quick action of Lt d'Albertis and Lt Kettren prevented personal injury and equipment damage and demonstrated the professional expertise of this SAC missile combat crew.

"STAY ALIVE IN'85— KEEP SAFETY FIRST"

A NARRATIVE

R. A. Disbrow
G. C. Wagner
HQ SAC/IGFG

Painful as it always is to hear about a friend or associate who suffers from a mishap, and despite the sorrow we feel for the victim and family, strangely we all too often believe that it simply could not happen to us. Sad to say, however, the same types of mishaps continue to occur, time and again. Of the several causes we see for mishaps, two broad categories seem to appear all too often. When an individual attempts to violate a long proven physical law or fails to exercise common sense a mishap becomes a near certainty.

The following mishaps recently happened to **them** — and they can also happen to you.

- A mechanic washed greasy coveralls in gasoline and placed them in a clothes dryer. The housing unit and dryer sustained considerable damage when the heating element caused ignition and expansion of the flammable vapor-air mixture.
- A shade tree mechanic was installing new shocks on his car while it was supported only by a bumper jack. When the car predictably slipped off the jack, the results were too painful to describe.
- A do-it-yourself electrician — who did not de-energize the wall switch he was repairing — placed a part of his body in lower resistance (leaning against a water pipe) and brushed against the live lead with his hand. Guess what lit up first?
- A technician failed to wear protective gloves while handling battery acid. Of course, it spilled on his unprotected hands, and the ensuing chemical reaction produced excruciating results.
- Three campers placed a lighted gasoline lantern inside a closed tent, and were asphyxiated due to displacement of oxygen.
- A moped owner teaching himself to ride discovered his personal coefficient of friction when he lost his balance and slid across a driveway on hands, knees, and chin.
- Another daring soul reproved the law of gravity when he slipped and fell from the second story ledge of his dorm, after climbing out his window in order to use the ledge to get to an adjacent room.

Now let's look at some other mishaps, not given very much publicity, and which may even appear humorous at first reading. Unfortunately, these mishaps resulted in injury, property damage and even death because someone failed to use common sense or exercise good judgment.

- An amateur daredevil and his buddy decided to try a new method of para-sailing, using a 50 foot rope, a parachute and a car. He put on the parachute, tied one end of the rope to the rear bumper of the car, the other end around his waist (with a slip knot) and instructed his buddy to drive slowly ahead until the slack was out of the rope. Upon a signal, his buddy was instructed

OF HARD KNOCKS

to "romp" down on the gas. The theory was that at this time the parachute would deploy and the pull of the rope would lift the chutist into the air where he would release the slip knot and then float down. However, the launch turned rapidly into an abort across the pavement, resulting in a multitude of injuries. The one smart move in all this, a helmet, probably saved a life.

- Another individual was not so lucky. He too tried out a parachute, but jumped off a bridge to get airborne. The parachute deployed but he ended up in a swiftly running river and drowned.
- Another "unbelievable" mishap occurred when a rather petite driver stopped in the middle of a busy highway to explore a strange noise coming from the engine. Turning off the ignition, the individual got out of the car, walked to the front, lifted up the hood, and leaned over to look for the problem just as another vehicle rear-ended the car. On impact, the victim was picked up and thrown into the engine compartment, the hood came down, and the car rolled off the road into the ditch. Rescuers spent several puzzled moments looking for the driver until they eventually heard muffled moans and opened the hood.
- Another tragic mishap occurred when a native from the Midwest, newly assigned to a base in Florida, failed to ask why all the people on the beach pier weren't swimming or diving. Instead, he blithely walked to the end of the pier, dove off, and discovered too late that the tide was out.
- In a related fatal accident, a vacationer dove from a dam into the water above a full running spillway. The heavy current pulled him over the spillway and he drowned.
- Finally, to reinforce the old adage "Look before you leap," we record this case. A group of young people were using a long rope, tied to the branch of a tree, to swing off a cliff and out over a river where they would release the rope and fall into the water. A newcomer to the group decided to try it. However, he did not know to grasp the rope at a point over his head like the others, and instead grasped it near the loose end. He walked back, took a running leap off the cliff, and . . . struck an unseen ledge below the lip of the cliff.

The point of all this? Mishaps are preventable and common sense is frequently the key. Heavy emphasis is making a difference. Last year SAC experienced its best year ever in the area of ground mishap fatalities. Still 28 people needlessly lost their lives. As we approach the annual "101 Critical Days" of summer, the potential for mishaps similar to those presented above increases dramatically. Therefore, during May, the command will emphasize ground safety during its second safety week of 1985. Take these programs to heart and remember our goal: **"Stay alive in '85 – keep safety first."**

IT CAN
HAPPEN
TO
YOU

Cont'd from page 20

jority of EWO actions must be completed in a fast-reaction mode. Instead, each of us must continually remind ourselves that CPOs provide the **minimum** performances — they are neither a substitute nor a crutch for sound, in-depth EWO knowledge and proficiency.

Getting back to the point, I've learned a little more about why CPOs were developed. I also gained a better grasp of what CPOs are and what they are not. But, despite everything I already knew and what I subsequently learned about CPOs, I still feel that "extra" which may have come with the package still poses the possible problem (as we saw with the deputy in the opening scenario) of using CPOs as a proficiency standard. How do we avoid this as a potential pitfall?

From what I've seen and learned, a first and very important step is to **recognize the potential** for CPOs to become accepted as the proficiency standard for excellence. The more I work with CPOs, the easier it is for me to see just how this might happen. CPOs are clear and straightforward and, with respect to their intended purpose, they are very inclusive. By content and design, they could easily become lesson plans. But again, they were not designed or intended to encompass all crew training requirements or set limits on crew proficiency. Once that is understood, we have taken a significant step in the right direction.

A second step to take to avoid the CPO pitfall is to look hard at our training and evaluation programs to ensure we are not endorsing CPOs as something they are not. A sideline, and strictly personal comment is — when crewmembers demonstrate more knowledge of time standards and what can and cannot be used in training/evaluation scenarios than they do of weapon system/EWO requirements, something is amiss! Strong training programs — those that stand above the rest — constantly focus their training efforts beyond the minimum levels and requirements of the CPOs.

However, of all the steps that can be taken, perhaps the most important are those that can be taken by the crewmembers themselves to ensure CPOs do not become a self-imposed limit to individual or crew proficiency. A high level of crew proficiency can only be achieved through a conscientious and dedicated crew self-study program. Such a program should include, but not necessarily be limited to, taking advantage of the self-study package available in the launch control centers. Exercises and practice exams should be worked together as a crew. The material presented should be discussed, and if there are some questions, the regulations should be used to find the answers. This preparation enhances the monthly recurring classroom training. If there are problems encountered in answering all the self-study questions, then the crew should find the time to ask the EWO instructors for guidance. Every MPT training session should be treated for what it is — another opportunity to learn a new concept and to refine crew procedures. A crew should not be afraid to practice or experiment during these sessions — that's what they're for. And, unlike the deputy crew commander in the opening scenario, the crew should elevate its sights and not be satisfied with meeting the minimum standard. Rather, each member should constantly strive to improve the crew's knowledge and level of proficiency.

Duty as a missile combat crew member is challenging — long hours, emergency situations requiring prompt and proper reaction, and, not to say the least — that next evaluation. These challenges can be successfully met through total comprehension of all aspects of the weapon system and EWO requirements built on a solid program of self study and self initiative. Proficiency is the goal — for both the individual and the crew. Each should strive for it — pursue it — achieve it. The unit, the command, and the American people deserve nothing less.

Editor's note: *HQ SAC DOMM and XOXOM have taken initiatives to change the emphasis on CPOs. A recent change to SACR 50-16 no longer prohibits documentation of student deficiencies encountered in MPT training scenarios that exceed CPO standards. A recent EWO guidance message stresses the need to train students beyond the minimums outlined in EWO CPOs. This issue will continue to be an item of interest in the missile operations community.*

As a prelude to *Combat Crew's* June anniversary issue, we invite you to participate in a little trivia quiz.

Q. What year was *Combat Crew* first published?

A. ____________________

Q. What was the original name of *Combat Crew*?

***A.* ____________________**

See answers in our June issue

SAC SAFETY SCREEN

The SAC Safety Screen is an honor roll of SAC's most professional crews. To gain listing on the Screen, crew members must be nominated by their unit commanders and meet high selection criteria of experience in their aircraft or missile system *IAW AFR 127-2/SS1.*

924 AREFS, Castle Crew E-117: P Capt Bradley K Jones, CP Capt Leo G Mora, N 1Lt Mario L Suarez, BO Sgt Jacqueline M Hale

93 AREFS, Castle Crew IT-17: IP Capt George T Nistico, IN Capt James Henry, IBO TSgt Claude F Arden

93 AREFS, Castle Crew IT-35: IP Capt Lewis F Wells Jr, IN Capt Terry H Hoyt, IBO SSgt Joseph A Ekroos

328 BMS, Castle IT-24: IP Capt John F Shaw Van, IRN Capt James M Ford, IEW Capt Frank A Schersing, IAG SSgt William D Briscoe

328 BMS, Castle Crew IT-11: IP Maj William W Harris, IRN Lt Col Harold W Hodges, IEW Capt William P Huben

9 AREFS, March Crew: P Maj Larry G Hastings, CP Capt Stephen W Heck Jr, F E MSgt Joe O Efird, BO MSgt Mark Fleege

9 AREFS, March Crew: P Capt Randy P Vieira, CP Capt Peter C Leonard, F E SSgt Ronald M Davis, BO MSgt Bruce W Lawson

22 AREFS, March Crew R-124: P Capt Michael Cordova, CP 2Lt Peter G Smith, NN 1Lt Eric D Karge, BO Sgt Laurie A Kent

22 AREFS, March Crew E-110: IP Maj John H Gabbert Jr, CP 1Lt Te H Lee, IN Maj William T Baker, BO SSgt James C Langford II

452 AREFW, March Crew: P Capt Ronald MacKenzie, CP Capt Carl Windsor, IN Maj Richard Stewart, N Capt Stephen Koeppel, IBO TSgt Brian O'Rourke

79 AREFW, March Crew: P Capt David Martin, IP Capt Kent McKinnel, IFE TSgt Patrick McManus, IBO SSgt Dirk Olsen

380 BMW, Plattsburgh Crew R-183: P Capt T Kelly, CP 1Lt R Nemeth, N 1Lt D Botting, BO SSgt J Long

380 BMW, Plattsburgh Crew R-170: P Maj J Sanders, CP 1Lt D Wright, N 1Lt J Woods, BO TSgt G Meyers

380 BMW, Plattsburgh Crew R-172: P Capt T Soszynski, CP 1Lt R Dopierala, N 1Lt R Smith, BO Sgt R Taylor

380 AREFS, Plattsburgh Crew R-125: P Capt Paul R Briggs, CP 1Lt Thomas J Lasko, N 1Lt Steven V Auchter, BO SSgt John G Phillips

91 AREFS, McConnell Crew E-106: P Capt Brian O Baldwin, CP Capt Susan L Fairchild, N Capt Michael D Wilson, IBO SSgt Mike L Lambert

384 AREFS, McConnell Crew E-159: IP Maj Joseph R Lentini II, CP 1Lt Kenneth W Randolph, N 2Lt Vincent N Iannuzzi, BO SrA Michael J Perry

381 SMW, McConnell Crew R-045: MCCC 1Lt Forrest D Burgess, DMCCC 1Lt Richard L Adcock, MSAT A1C Eric D Watjen, MFT A1C Phillip A Sells

91 SMW, Minot Crew E-061: MCCC Capt Charles D Bowker, DMCCC Capt David J Wallace

351 SMW, Whiteman Crew R-135: MCCC Capt James A Marker Jr DMCCC 2Lt Todd M Renner

308 SMW, Little Rock Crew E-195: MCCC 1Lt James D Hughes, DMCCC 2Lt James C Otteson, MSAT A1C Paul J Howard, MSAT A1C Wayne E Crawford, MFT A1C Albert J Deboo

351 SMW, Whiteman Crew R-086: MCCC 1Lt David B Buck, DMCCC 2Lt James C Willoughby

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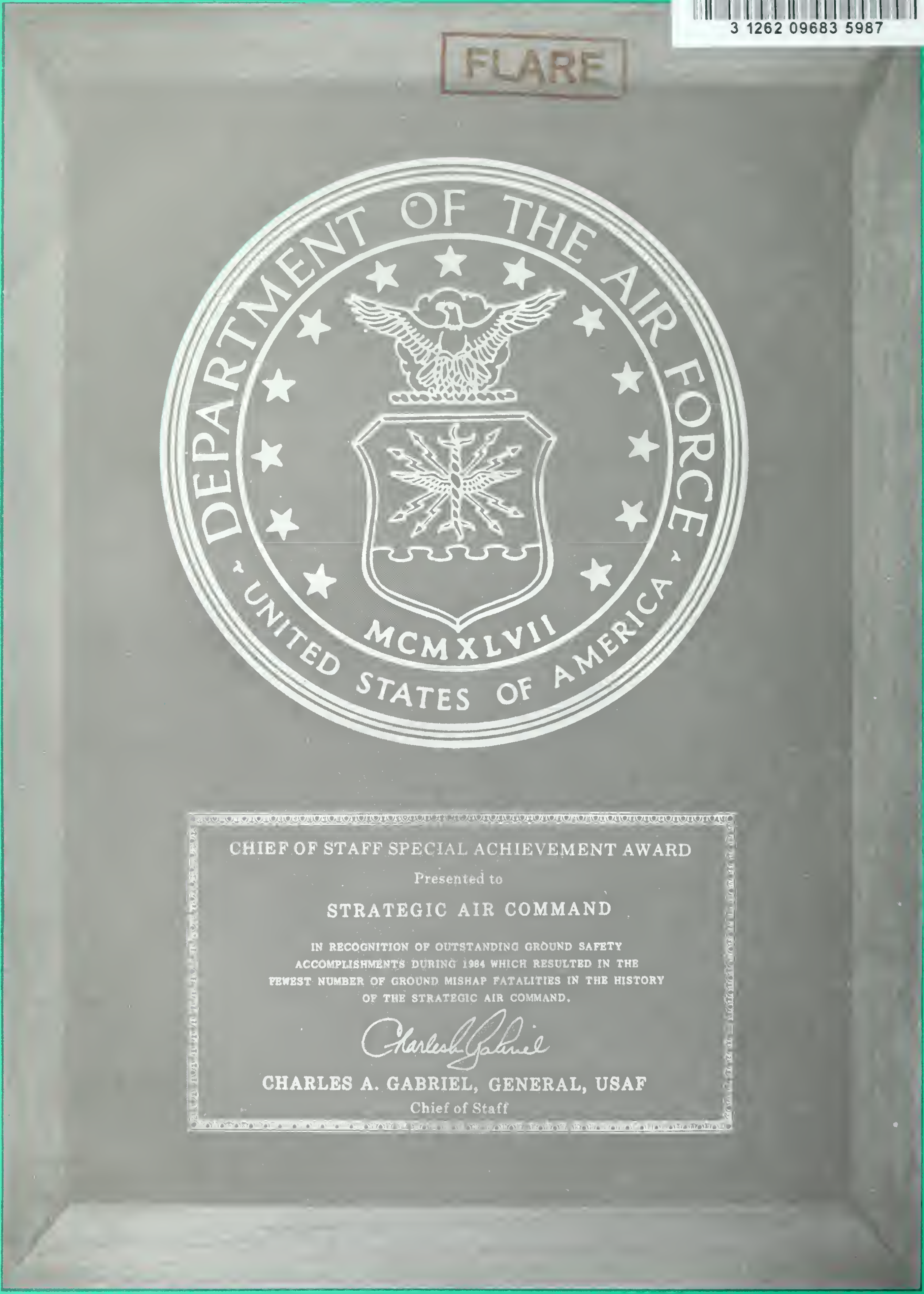

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Charles A Gabriel

CHARLES A. GABRIEL, GENERAL, USAF
Chief of Staff